UNIDO

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

REGIONAL CONSULTATION ON THE PETROCHEMICAL INDUSTRY IN THE ARAB COUNTRIES

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PREFACE

The Lima Declaration and Plan of Action on Industrial Development and Cooperation adopted by the Second General Conference of the United Nations Industrial Development Organization (UNIDO), held at Lima, Peru, in March 1975, and subsequently endorsed by the General Assembly, recommended that UNIDO should include among its activities a system of continuing consultations between developed and developing countries with the object of raising the developing countries' share in world industrial output through increased international cooperation. 1/

In May 1980, the Industrial Development Board of UNIDO decided to put the System of Consultations on a permanent basis and, in May 1982, it adopted its rules of procedure 2/ setting out its principles, objectives and characteristics, notably:

> The System of Consultations shall be an instrument through which UNIDO is to serve as a forum for developed and developing countries in their contacts and consultations directed towards the industrialization of developing countries; 3/
>
> The System of Consultations would also permit negotiations among interested parties at their request, at the same time as or after consultations; 4/
>
> Participants of each country should include officials of Governments as well as representatives of industry, labour, consumer groups and others, as deemed appropriate by each Government; 5/
>
> Each Consultation Meeting shall formulate a report, which shall include conclusions and recommendations agreed upon by consensus and also other significant views expressed during the discussions. 6/

Since 1975, Consultation meetings have been convened on agricultural machinery, building materials, capital goods, electronics, fertilizers, fisheries, food-processing, industrial financing, iron and steel, leather and leather products, non-ferrous metals, petrochemicals, pharmaceuticals, small- and

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1/ Report of the Second General Conference of the United Nations Industrial Development Organization (ID/CONF.3/31), chap. IV, "The Lima Declaration and Plan of Action on Industrial Development and Cooperation", para. 66.

2/ See The System of Consultations (PI/84).

3/ Ibid., para. 1.

4/ Ibid., para. 3.

5/ Ibid., para. 23.

6/ Ibid., para. 46.

medium-scale enterprises, the training of industrial manpower, vegetable oils and fats, and wood and wood products. Three Consultation meetings on the petrochemical industry have been held at Mexico City (1979), Istanbul (1981) and Vienna (1985).

The Consultation process, by virtue of its consensual and normative character, has revealed itself to be an efficient vehicle for fostering cooperation. It is eminently suited to assist member States in the formulation of strategies and policies for industrial development.

The System of Consultations operates under the continuous and close guidance of the Industrial Development Board. In addition to undergoing annual reviews and periodic appraisals, the System was subjected to an in-depth evaluation in 1989, which concluded that it was making a major contribution to the development and formulation of UNIDO policies and programmes in specific sectors through integration and interaction with the other main activities.

During the second regular session of the General Conference of UNIDO, held at Bangkok, 9-13 November 1987, representatives of several Arab Governments expressed the desire to hold a regional consultation on the petrochemical industry in the Arab countries. Both the Arab Industrial Development and Mining Organization (AIDMO) and the Organization of Arab Petroleum Exporting Countries (OAPEC) expressed the desire to cooperate with UNIDO in organizing such a meeting. This interest was also expressed by the Gulf Organization for Industrial Consulting (GOIC), an Arab intergovernmental organization.

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INTRODUCTION

1. The Regional Consultation on the Petrochemical Industry in the Arab Countries was held at Innsbruck, Austria, from 22 to 25 June 1992. It was attended by 92 participants from 31 countries, and 5 international organizations (see annex I).

Background

2. One of the most challenging enterprises of the modern age is the petrochemical industry, emerging from a vast wealth of natural resources and inviting endless opportunities for development in all its facets. Petrochemical products have become a necessity of everyday life, both in the developed and the developing countries. Moreover, the petrochemical industry has played a vital role in the development of the world economy and its wide range of products has enriched the economic welfare of humanity at large. Thus, the need for an integrated development of this industry with other sectors of the economy is self-evident.

3. In addition to devising advanced technical procedures to improve the basic petrochemicals, the industry has become vigorously involved in creating new products that not only compete with, but also surpass, traditional materials. For example, commodity resins, particularly rubber, elastomers and engineering polymers, serve as excellent substitutes for metals, wood and other construction materials in a variety of applications. Synthetic fibres and rubbers have now largely outclassed traditional materials in both performance and economy.

4. In the Arab countries, it is evident that the petrochemical industry is a vital key to the future industrialization and development of the region, since a great number of economic sectors and activities are being served by a large variety of petrochemical products. By the turn of the century when the population of these countries is expected to reach some 250 million, the regional demand for intermediate and consumer commodities manufactured from petrochemical products will grow considerably in order to meet the basic needs for food, clothing and housing. Furthermore, as new complexes have come on stream in the Middle East and northern Africa, Arab countries have made an impact on the global petrochemical industry.

5. Food and agriculture-related industries, which are particularly important to the Arab region, depend for their expansion on petrochemical products, such as fertilizers, plastic materials for irrigation, farm and greenhouse materials, and packaging for agricultural and processed food products. It is also clear that the nascent Arab petrochemical market has great potential for petrochemical products.

6. The availability of crude oil, natural gas and other hydrocarbon products as sources of raw materials and energy, as well as the easy access to investment capital and untapped potential markets for consumption, has made it very attractive for Arab countries to enter the petrochemical industry. Nevertheless, they have faced a host of problems such as an inadequate physical and human resource infrastructure, high construction costs, operation and maintenance difficulties, limited research and development capabilities and a lack of efficient planning and marketing expertise. In spite of all these problems many Arab countries have built, alone or as a joint venture with a foreign partner, a host of petrochemical plants, particularly during the late 1970s

and early 1980s. Some of the products of these plants have reached international markets, mainly because of the limited domestic market; other obstacles, however, confront the new producers. The steep drop in the prices of hydrocarbons has eroded many of the inherent advantages of Arab producers; in addition, protectionist measures have been adopted by the traditional markets for their products.

7. It has become evident that, in order to maintain their viability as producers, the Arab countries need a higher and more intensive level of cooperation and coordination on national, regional and interregional scales. The adoption of such a policy by Arab petrochemical producers would involve different and newer concepts of industrial strategy concerning various means of cooperation, coordination and integration.

Preparatory activities

8. In preparation for the Regional Consultation on the Petrochemical Industry in the Arab Countries, the Preliminary Meeting held at Baghdad, 19-20 February 1989, and the First Preparatory Meeting held at Vienna, 26-29 September 1989, reached a set of conclusions, adopted recommendations and welcomed the commitment of cooperating organizations in undertaking petrochemical studies. The Asian-Arab Preparatory Meeting for the Regional Consultation on the Petrochemical Industry in the Arab Countries, held at Karachi, 27-30 November 1989, gathered a large group of representative experts from Arab and Asian countries.

9. The last phase of the preparatory work was the Global Preparatory Meeting for the Regional Consultation on the Petrochemical Industry in the Arab Countries, held at Karachi, 10-13 December 1991. The main objective was to identify the five priority elements of the issue to be examined by the Regional Consultation.

Objectives

10. The main objectives of the Regional Consultation were:

(a) To formulate concrete recommendations, addressing policy matters as well as technological and financial aspects of the issue on the basis of the key role played by international cooperation;

(b) To promote contacts between participants with a view to developing projects for technical cooperation, technology transfer and investment promotion.

The issue

11. The Global Preparatory Meeting, drawing on its detailed discussions, as well as on the deliberations of previous UNIDO expert group meetings, established the following five items as the constituent elements of the issue on the integrated development of the petrochemical industry in the Arab countries for consideration by the Regional Consultation:

(a) Cooperation, coordination and integration in the field of petrochemicals;

(b) Marketing and market development;

(c) Infrastructure development;

(d) Impact of technological development on the petrochemical industry;

(e) Environmental protection and safety.

AGREED CONCLUSIONS AND RECOMMENDATIONS

12. The Regional Consultation on the Petrochemical Industry in the Arab Countries agreed on the following conclusions and recommendations:

Cooperation, coordination and integration in the field of petrochemicals

(1) National economic policies in the Arab countries should be reviewed to permit the full integration of the petrochemical industry with the other economic sectors. In this context, due consideration should be given to the development of the upstream and downstream processing industries.

(2) The Arab countries should, with the assistance of UNIDO, collect and periodically update information on a regional basis on existing capacity, present and potential product demand, sources of available technology, equipment and related items, upon the request of a Member State and other relevant entities.

(3) Partnership arrangements should be encouraged as the most practical means and mechanisms for cooperation, whether between Arab countries or producers or between them and partners from other regions. Such partnerships should pay due attention to the mutual interests of the parties concerned.

(4) When requested, UNIDO should assist the Arab countries in the formulation of their petrochemical industry policies to improve regional resource utilization, to strengthen production and market complementarity and to enhance inter-Arab and interregional trade in petrochemicals.

Marketing and market development

(5) The adoption of effective marketing policies and strategies based on identified consumer needs should be regarded as an indispensable condition for market development for petrochemicals, covering products, prices, availability and quality, as well as product promotion and assistance in end-use.

(6) The downstream processing industries should be established wherever viable to increase the use of petrochemicals in various sectors of activity, particularly construction, agriculture, clothing and health care, which offer a large potential for domestic market development substantiated by detailed market studies.

(7) With respect to international markets for basic and intermediate products, the Arab petrochemical producers are encouraged to undertake a strategic assessment of their overall trade policies and, on that basis, to enter into innovative and collaborative partnership arrangements.

(8) The crucial role of market intelligence and information should be fully recognized as providing the basis for any effective marketing strategy. For this purpose, the appropriate information networks on market-related parameters can render invaluable assistance.

(9) At the request of the countries concerned, UNIDO should provide assistance to enable the Arab and other countries to exchange views and information, particularly on supply/demand balances in the petrochemical industry.

Infrastructure development

(10) The physical infrastructure in many Arab countries in support of the petrochemical industry should be strengthened. However, in view of the importance of such infrastructure for overall economic development, the cost associated with the maintenance and enhancement of its development should not be borne by the petrochemical industry alone.

(11) Effective measures should be taken to strengthen the proven capability in the Arab region for engineering design, plant construction and the manufacture of certain items of equipment and machinery.

(12) Due consideration should be given to the promotion and intensification of personnel training at all levels, within the framework of human resource development, for the efficient operation, maintenance and safety of petrochemical plants.

(13) Arab petrochemical enterprises should be encouraged to set up their own research and development facilities to supplement their cooperation with academic and technological institutes with a view to facilitating the absorption and improvement of imported technologies to suit local conditions.

Impact of technological development on the petrochemical industry

(14) To increase their international competitiveness through quality assurance and productivity, Arab petrochemical manufacturers should:

(a) Develop a Quality Assurance System in their companies;

(b) Strengthen their process development capabilities;

(c) Decrease their costs by reducing waste;

(d) Introduce preventive maintenance systems and enhance their spare parts manufacturing and management;

(e) Improve their management procedures and practices;

(f) Upgrade their managerial skills.

(15) These measures will also promote Responsible Care and protection of the environment.

Environmental protection and safety

(16) On the basis of accepted international standards, the Arab petrochemical industry should continue to give adequate consideration to solving problems of environmental protection and safety so as to avoid the adverse effects of pollutants on human health and damage to nature and property.

(17) The Arab petrochemical industry should continue to stress its desire to enhance safety, both to prevent risks and to respond to accidents.

(18) Petrochemical producers in Arab countries should avail themselves of new technologies to minimize or treat solid and liquid wastes and to abate pollution problems.

(19) In order to counteract the inadequate legislation on standards concerning the elimination of hazardous wastes and poisonous chemicals, in developing countries in general and in the Arab region in particular, international agencies are asked to assist these countries in the formulation and harmonization of recognized guidelines, norms and specifications for permissible emissions and by-product disposal.

(20) The problem of environmental pollution can often be traced back to the inefficient use of raw materials and energy in the petrochemical plant. This can be largely solved by the proper selection of process technologies and the efficient operation of the complexes by adequately trained personnel.

(21) In cooperation with the United Nations Environment Programme (UNEP) and other relevant entities, UNIDO should elaborate a comprehensive Responsible Care Programme (RCP) in the development of the petrochemical industry, in the developing countries in general and in the Arab countries in particular.

I. ORGANIZATION OF THE REGIONAL CONSULTATION

Opening of the Regional Consultation

Statement by a representative of the Austrian Federal Ministry for Public Economy and Transport

13. A representative of the Austrian Federal Ministry for Public Economy and Transport welcomed the participants to Austria. He exhorted the international business world to make use of the advantages of Austria as a springboard for the opening new markets.

14. He referred to one of the main components of the nationalized industrial group, the goal of which was to increase further its share of domestic oil in meeting its processing needs, through the acquisition of productive oilfields or interests therein.

Statement on behalf of the Director-General of UNIDO

15. The Director of the System of Consultations, speaking on behalf of the Director-General of UNIDO, expressed his conviction that the conclusions and recommendations of the Regional Consultation would be based on a realistic assessment of the situation throughout the Arab region. The exchange of experience and the recommendations to be agreed upon at the Regional Consultation would help UNIDO, Governments and industry not only to introduce measures to improve the development of the petrochemical industry, but also to foster closer cooperation at the regional and international levels.

Presentation of UNIDO activities

16. A representative of the UNIDO Secretariat pointed out the crucial importance of the petrochemical sector to the Arab countries owing to the extent of the financial and technological resources that had been mobilized for its establishment, and the vast prospects for upstream and downstream development that it continued to offer those countries.

17. He said that the development of the sector constituted a favourable way of improving the integration of Arab economies through the development of technological exchange and trade between them and the developed countries as well as the developing countries.

18. Although the quality of feasibility studies undertaken in Arab countries had improved, there was still a need for technical assistance to study export markets for petrochemical products. It was necessary to define what products were marketable where, and to develop a sound marketing strategy in order to enter, and remain in, competitive export markets.

19. Another representative presented an overview of UNIDO technical cooperation activities in the field of petrochemicals. UNIDO activities involved providing on-the-spot technical cooperation, carrying out market surveys and preparing studies and dossiers for decision makers, government authorities and financing institutions. Other components of the programme were: providing advisory services; facilitating access to a large purchase pool; making the transfer of technology smoother; and promoting technical cooperation between developing countries through technical cooperation programmes.

20. Another representative described the activities of the Industrial Investment Programme of UNIDO. She explained how the programme assisted industrialists in developing countries to identify, formulate and promote their investment projects, thereby enabling them to conclude business agreements for the purpose of obtaining the investment resources required for the implementation of their projects.

21. Another representative presented the UNIDO technology programme. He said that UNIDO was about to set up a computerized database on petrochemicals in developing countries, including the Arab region, and could answer queries related to the petrochemical industry. A directory on the technological capabilities of developing countries in the petrochemical industry had been completed, which contained data and information on producers, products, capacity, raw material and processes.

22. Another representative described the capabilities of UNIDO in the petrochemical sector and emphasized the opportunities for direct cooperation with companies. Despite constraints on the availability of financial resources, UNIDO had participated significantly in the development of petrochemical industries in many countries, such as Argentina, Brazil, China and Egypt.

23. UNIDO capabilities involved improving plant performance, marketing and market development, special training services, procuring equipment and spare parts, sourcing technology, advising on project financing and developing projects promoted by development finance institutions.

24. Another representative distributed a paper on economic and technical cooperation in petrochemicals between the countries of the Arab region. It described four different sets of goals and activities; namely: (a) developing mechanisms for cooperation; (b) generating support for regional and subregional groupings (including manufacturers' or producers' associations); (c) enhancing the use of economic and technical cooperation by developing countries; and (d) developing information services.

Election of officers

25. The following officers were elected:

Chairman:	Franz Narbershuber (Austria) member of the Board of Chemie Linz AG
Rapporteur:	George Mkassi (United Republic of Tanzania), Head of the Chemical Industries Sector of the Ministry of Industry and Trade
Vice-Chairmen:	Ahmed Moustafa Dessouki (Egypt), Petrochemical Adviser, Egyptian General Petroleum Corporation
	Abdessami Djellali (Algeria), Technical Director of the Algerian National Enterprise of Petrochemical Industries

Adoption of the agenda

26. The following agenda was adopted:

1. Opening of the Consultation
2. Election of the Chairman, Vice-Chairmen and Rapporteur
3. Adoption of the agenda and organization of work
4. Current status of, and prospects for, the petrochemical industry in the Arab countries
5. Review of UNIDO activities in the petrochemical industry in the region
6. Discussion of the issue: The integrated development of the petrochemical industry in the Arab countries:
   (a) Cooperation, coordination and integration in the field of petrochemicals
   (b) Marketing and market development
   (c) Infrastructure development
   (d) Impact of technological development on the petrochemical industry
   (e) Environmental protection and safety
7. Identification of or negotiations on industrial investment, technical cooperation and transfer of technology projects
8. Conclusions and recommendations for further action
9. Adoption of the report of the meeting

Documentation

27. The documents issued prior to the Consultation are listed in annex II.

Adoption of the report

28. The report of the Regional Consultation on the Petrochemical Industry in the Arab Countries was adopted by consensus at the final plenary on 24 June 1992.

II. REPORT OF THE PLENARY SESSIONS

Presentation of the issue

29. A member of the UNIDO Secretariat made a comprehensive presentation of the issue. He briefly described the current status of the petrochemical industry, the revival of which, after the setbacks of the early 1980s, was truly global in scope, causing problems yet offering opportunities. However, the supremacy of technological innovation, the hallmark of the 1970s, had given way to matters of supply and demand, distribution and international trade.

30. Several Arab oil- and gas-producing countries possessed a well-developed oil refining and petrochemical industry. The total production capacity of the Arab petrochemical industry had been estimated at about 11.62 million tonnes per year of basic, intermediate and end-products. Ethylene production capacity amounted to 2.8 million tonnes, which constituted about 25 per cent of the total Arab petrochemical production capacity.

Cooperation

31. As regards the first element of the issue, he said that owing to a lack of proper integration in the development of the industry, the Arab region as a whole had depended on outside suppliers for its requirements of downstream finished products or some basic and intermediate feedstocks to produce them. Seen in the context of the prevailing changes in the global petrochemical industry, the integration of the petrochemical industry in the Arab region, through cooperation and coordination, had become essential for the economic viability of Arab petrochemical producers. In view of its complexity, high investment costs and the great number and variety of products, as well as the unstable supplies and prices of raw materials, the petrochemical industry lent itself well to coordination and cooperation. Regional and international cooperation in the petrochemicals sector should, however, be based upon clearly defined and mutually beneficial objectives.

32. Integration also implied a wider scope of interconnection between several sectors of national economies. At the enterprise level, it might assume a vertical integration involving addition and modification, or the expansion of an activity to produce alternative raw materials, intermediates or other inputs that had formerly been obtained from other sources.

Marketing

33. He said that Arab producers of basic and intermediate petrochemical products depended mostly upon export markets. With the changing situation of the industry worldwide, they had become vulnerable to external problems such as global over-capacity, saturation in export markets, volatility in prices and economic recession in the consumer countries.

34. It had become crucial for the producers of the Arab region to develop regional markets for their products, especially because of the potential reflected in the current low consumption level of downstream petrochemical products in the Arab region compared with that in the developed countries.

Technological development

35. He reminded the participants that technological changes played a crucial role in determining the level of development of the petrochemical industry owing to the extremely diversified fields of application for its wide range of products. The global industry had overcome the critical constraints of feedstock price increases and economic recession in the 1970s and 1980s largely through the technological improvement of production processes. Technological innovations in the industry involved creating new materials and products that not only competed with, but also surpassed the quality of, traditional materials and products on the basis of cost/performance effectiveness.

36. Like most developing regions, the Arab region had acquired process technologies from the developed countries and depended heavily on them. In developed countries, because of the availability of technological capabilities and strong back-up facilities and services, any technological improvement was readily assimilated by the industry. In developing countries, the absence of such support gave rise to many technical problems resulting in a slow assimilation rate and inferior product quality, especially when downstream products had to be manufactured and modified to suit local or regional needs.

Infrastructure

37. In developing countries, one of the main obstacles to the development of the petrochemical industry was the lack of adequate infrastructure, which directly affected the efficiency of production units, the degree of local and regional cooperation in marketing, research and development and supportive activities. Occasionally, petrochemical projects that would otherwise have been viable had not been implemented on account of the prohibitive costs associated with the development of the required infrastructure.

38. The establishment of infrastructure should, therefore, be incorporated in the economic development plan of the country and not be evaluated in the context of the petrochemical sector alone. The petrochemicals industry should coordinate closely with the public sector to ensure fulfilment of those specific needs. Subregional or regional cooperation might provide an added impetus for the development of such infrastructure.

Environmental protection and safety

39. He said that the origins of waste and effluent in the petrochemical industry could normally be traced back to spillage, unreacted raw materials, impurities in the reactants, undesirable by-products, unusable materials generated during upsets, start-ups and shutdowns, fugitive releases, spent auxiliary materials, materials generated during sampling, handling or storage and used maintenance materials. A closer examination of these elements would reveal that an attitude conducive to minimizing waste generation would bring about considerable operational improvements, resulting in increases in productivity and economic gains, as well as considerable but hard-to-quantify sources of environmental protection.

Summary of discussions

General debate

40. An observer proposed the establishment of an international centre for petrochemicals, which would be a forum for consumers and producers of petrochemicals to discuss mutual problems and to coordinate action on common interests. Initial membership would be confined to government bodies and the private sector in the major producer and consumer countries; counterparts in other countries would be invited to join later. The centre would advise on the coordination of policies for the development of petrochemicals, undertake studies of common interest, provide technical and economic information services, and arrange meetings and seminars to enhance mutual understanding.

41. One participant said that, from his practical experience, the petrochemicals sector should have a research and development centre associated with the manufacturing plants, which would enable them to assimilate technology and eventually introduce modifications as well as solve day-to-day problems.

42. A participant from a developed country reaffirmed that the petrochemical industry was global in nature and therefore all investment decisions had to be taken in a global context. That was equally true for competitive pricing, quality, environmental protection and safety. The same participant endorsed the choice of the elements of the issue submitted to the Regional Consultation and commended the Secretariat for the quality and scope of the documentation presented. He declared his country's keen interest in enhanced cooperation with developing countries in all facets of the petrochemical industry.

43. A participant, also from a developed country, expressed his appreciation for the Secretariat's efforts in identifying the elements of the issue at the Regional Consultation. He related the necessity of developing the petrochemical industry in the Arab region to the region's special socio-economic conditions, and stressed the need for an orderly growth of the industry, based on practical requirements and conditions. He underlined the importance of creating a climate of confidence for direct foreign investment; of building up indispensable infrastructure (an aspect to which many developing countries had not paid enough attention); of accurate planning and close control of project implementation; of human resource development; and of respect for environmental protection. He mentioned his country's achievements in the sector and the benefits that developing countries could derive from them.

44. The representative of the League of Arab States (LAS) urged the Consultation to be more action-oriented. She stressed the need for a centralized Arab petrochemical database to analyse production and consumption patterns. She also requested UNIDO technical assistance in coordinating policies and activities of the Arab region in the petrochemicals sector, and in solving problems in accessing international markets and creating regional demand. The problem of access to international markets for Arab petrochemicals was reiterated by another participant also.

45. A participant from a developing country observed that the Arab petrochemical industry had started 5-10 years earlier than that of South-East Asia. While there were some differences in the petrochemical industry of the two regions concerning the availability of raw materials and the absorption of

basic and intermediate products in local downstream industries, both regions had similar problems. She proposed that a regional consultation for the South-East Asian region should also be convened.

46. One participant from an Arab country mentioned that his country did not have a petrochemical industry; however, recognizing its importance, it was conducting a study on the feasibility of entering the sector. His country was participating in the Regional Consultation in order to gain from the practical experience of others.

47. Several participants described the state of the petrochemical industries in their countries and proposed various types of cooperation between themselves. They also sought UNIDO assistance for further improvement in the sector.

48. A participant brought up the subject of the global warming effect of flaring natural gas in the Arab region and requested UNIDO assistance in counteracting that practice.

49. The representative of the Economic and Social Commission for Western Asia (ESCWA) drew attention to the application of science and technology in achieving product excellence. He said that, despite the capabilities of competent Arab scientists working in Europe, the Arab region's contribution was currently almost zero and urged that UNIDO provide assistance.

50. A participant from a northern African country reaffirmed the need for cooperation in the petrochemical sector in the Maghreb region. He stressed that Arab Governments should be made more aware of the usefulness of the petrochemical industry in international cooperation and of the need for economic integration and for mastering the energy problems of the petrochemical industry.

51. Another participant proposed the setting up, with UNIDO assistance, of five centres to assist the Arab and other developing countries in their petrochemical sector: a marketing centre; a development financing institution for the petrochemical industry; a design centre; a research and development centre; and a petrochemical data bank.

52. The Secretary-General of the Association of Petrochemical Producers in Europe (APPE) identified the lack of reliable data on which future investment decisions could be made as a key problem. He warned that the industry would have to deal with a world-wide overcapacity problem and reiterated the necessity for pooling information on capacity and production. He said that APPE was willing to make such information available to UNIDO and others.

The five elements of the issue

Cooperation, coordination and integration in the field of petrochemicals

53. In his introductory remarks on the issue, a UNIDO representative said that the petrochemical industry was an investment-intensive industry involving an enormous variety of products and applications in every sector of the economy, and requiring a well-developed infrastructure, high technological bases, advanced research and development, and marketing experience. No single developing country possessed all the elements required for promoting the industry successfully, which made it a natural candidate for cooperation, coordination and

integration. He referred to insufficient cooperative activities in those fields in the Arab region and underlined the need for enhanced efforts for the overall growth of the economy.

54. The Secretary-General of APPE said that, currently, there was overcapacity in the petrochemical industry. Instead of establishing further capacity, cooperation should be aimed at reducing the excess capacity. In his opinion, the overcapacity resulted largely from the lack of dependable data on market intelligence and on the demand and supply situation and therefore a data bank should be established to provide the necessary guidelines for future investment.

55. The situation of overcapacity was clarified by a representative of the UNIDO Secretariat, who stated that overcapacity resulted not from uninformed investments by individual producers, but from the outcome of the cyclical nature of the petrochemical industry. During the upturn of the cycle, the industry had made considerable profits and, anticipating a further demand in growth, had channelled the cash thus generated into further investment, which had led to overcapacity and the downturn of the cycle, resulting in the capacity squeeze.

56. Many participants considered that there might be overcapacity in some regions but, given the current situation in the Arab countries concerning hydrocarbon resources, growing markets and an expanding economy, there were opportunities and needs for the establishment of petrochemical downstream projects and the better integration of the industry with other sectors of the national economies of the region.

57. Some participants requested UNIDO assistance in setting up a petrochemical data bank for the Arab region for the collection and dissemination of pertinent data and information to facilitate cooperation and greater communication between Arab producers and those of other regions.

58. The participants agreed that partnership arrangements were the most practical means for cooperation in all facets of the petrochemical industry; for example, infrastructure development including water desalination plants, research and development, training and technology transfer.

59. The representative of ESCWA said that the Arab region had the raw material and funds necessary for setting up petrochemical industries but lacked technology and know-how. Therefore, in setting up a science and technology centre, it would be particularly important to identify and promote new applications for plastics and to undertake comprehensive market research.

60. Regarding the contribution of UNIDO to cooperation between Arab petrochemical producers, a representative of the Secretariat informed the participants that, at a meeting held at Cairo in October 1991, it had been decided to form a working group, with UNIDO participation, to set up an interregional entity that would act as the focal point for developing infrastructure, research and development activities, environmental issues and other matters of common concern to North African and Western Asian countries in the field of petrochemicals.

Marketing and market development

61. A representative of the Secretariat briefly described the current situation concerning the marketing of the petrochemical products of Arab industries. Compared with other segments of the industry, marketing activities were not as well developed. The current production and consumption pattern of petrochemicals in the region provided ample opportunities for market development by installing downstream petrochemical industries and adopting marketing strategies to satisfy customer needs.

62. Participants were reminded that the emergence and growth of the Arab petrochemical industry was raw-material-driven rather than market-driven, and therefore market development had been somewhat neglected. This called for enhanced marketing efforts. The participants stressed the need to adopt proper marketing strategies pertaining to price, availability and quality, as well as product promotion, to increase the use of petrochemicals in other sectors of the economy.

63. It was agreed that detailed and comprehensive market surveys should be conducted covering all aspects of marketing at the national, regional, subregional and international levels with a view to determining the actual demand for Arab petrochemicals.

64. The representative of LAS said that Arab petrochemical products were facing difficulties in accessing the markets of developed countries, because of the tariff and non-tariff barriers erected by those countries, which hampered the development of the industry in the Arab region. UNIDO was requested to bring that problem to the attention of the international organizations concerned, with the aim of finding satisfactory and equitable solutions.

65. In response to various requests directed to UNIDO, the Director of the System of Consultations Division informed the participants that, upon request, UNIDO had extended technical assistance to developing countries in their industrialization process. The agreed conclusions and recommendations of the Consultation meetings gave UNIDO the mandate to recommend industrial policy matters to Governments. He also stressed the crucial importance of marketing and market development and said that detailed market surveys should be carried out at an early stage or during the project feasibility phase in order to assess customer needs realistically. Quality control and internationally recognized production standards must also be strictly maintained.

Infrastructure development

66. A representative of UNIDO pointed out that, more than any other industry, the petrochemical industry needed a well-developed infrastructure for its growth: not only physical infrastructure, but also human and organizational infrastructure. An important factor in deciding on the location of a petrochemical complex was the availability of physical infrastructure such as a port, storage facilities, communication and transportation systems. However, qualified human resources for operations, research and development, engineering design and plant construction, and institutional infrastructure such as research and development centres, engineering and consulting bureaux, centres of excellence, marketing centres, training institutes and financing organizations, had an important role in facilitating the more rapid integration of the petrochemical industry into the national economy. He said further that one of

the basic mistakes made by many new petrochemical producers in developing countries was underestimating the importance of infrastructure.

67. Participants pointed out that the development of some of the physical infrastructure required; namely, a port and transportation and communication systems, involved huge investments. Those costs should not be allocated to the petrochemical industry alone, but should rather be evaluated in terms of their importance to the overall economic development of the country and incorporated in the Government's long-term development plans.

68. Participants concurred that, in view of the highly developed technological base of the petrochemical industry and the wide and diversified variety of its products, the petrochemical industry needed adequately skilled human resources at all levels from designing equipment to production, as well as from marketing to after-sales services. All the participants therefore, strongly emphasized the crucial role of training.

69. The importance of industry-associated research and development facilities to solve operational problems and to help assimilate imported technology, as well as the need for close linkages between industry and technical universities, was also highlighted. Research and development constituted the weakest link and therefore such activities should be enhanced as a matter of urgency.

Impact of technological development on the petrochemical industry

70. A representative of UNIDO opened the discussions by briefly describing the impact of technology on the Arab petrochemical industry. Like many other developing countries, Arab countries were heavily dependent upon imported technology and there was an urgent need for research and development activities in the Arab region to develop new materials and catalysts so that they could be more self-reliant. This view was supported by the representative of ESCWA.

71. The participants agreed that technology in the petrochemical sector was changing rapidly and that there was therefore a need for research and development activities to update and assimilate imported technologies, as well as for measures that would promote energy saving and reduce production costs.

72. Several participants from developed countries described their countries' technological capabilities and expressed their willingness to cooperate with the developing countries to produce mutually beneficial synergetic effects.

73. It was pointed out that technology transfer to the Arab region through joint-venture arrangements between Arab countries with hydrocarbon resources, and developed countries of the former Soviet bloc with well developed technological capabilities, was possible. In order for the joint ventures to be successful, both the parties should contribute actively, otherwise one party could become disenchanted thus causing the venture to fail.

74. One participant pointed out that, in many instances, 80 per cent of the equipment and machinery, such as storage tanks, processing vessels and piping, could be obtained locally and stressed the need for the full utilization of locally available resources.

75. Regarding joint-venture arrangements between developed and developing countries, a representative of UNIDO said that a detailed study had been undertaken by UNIDO in 1985 on the potential and limitations of joint ventures. 1/ The report, which was available from UNIDO, might be useful for those intending to undertake joint ventures.

Environmental protection and safety

76. A representative of UNIDO briefly described the environmental and safety aspects of the Arab petrochemical industry, which had generated pollutants. He said that steps should be taken to protect the environment. He also cited relevant provisions from Agenda 21 of the United Nations Conference on Environment and Development held at Rio de Janeiro in June 1992.

77. The participants agreed that environmental pollution was not a regional phenomenon but a global one. The need for proper legislation, for advisory bodies to monitor the application of rules and standards and for technical assistance to the developing countries was stressed. It was also agreed that promoting public awareness was often a crucial first step in tackling environmental problems.

78. A participant from a developed country mentioned that it was no longer possible to wait until proper international legislation had been introduced. Europe, Japan and the United States of America had already taken steps to protect the environment. In the United States, such efforts were known as Responsible Care and in Europe as ecological awareness. He said that European petrochemical producers had already started to work responsibly by setting up comprehensive guidelines.

79. Participants were reminded that environmental pollution in the petrochemical industry of developing countries resulted from three main sources: leakage, wastage and the lack of quality control of finished products. To prevent such pollution, appropriate technologies should be chosen. The need for research and development activities to minimize waste by improving existing technologies and treating waste more effectively was also emphasized.

1/ "Survey and analysis of joint-venture arrangements in the petrochemical industry" (ID/WG.448/4).

Annex I

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Annex II

LIST OF DOCUMENTS

Document symbol	Title
	Discussion documents
ID/WG.524/1(SPEC.)	Issue paper: Integrated development of the petrochemical industry in the Arab countries
ID/WG.524/2(SPEC.)	A study on the status and prospects for cooperation in the petrochemical industry in the Arab countries
	Background documents
ID/WG.522/3(SPEC.)	Report of the Asian-Arab Preparatory Meeting for the Regional Consultation on the Petrochemical Industry in the Arab Countries, Karachi, Pakistan, 27-30 November 1989
Draft	Some developments of polymeric materials for application in agricultural and food industry
Draft	Introduction to the Algerian plastics processing industries: Application of plastics in agriculture, hydraulics and agro-industry
ID/WG.522/1(SPEC.)	Study on trends in technological development in the petrochemical industry
ID/WG.522/2(SPEC.)	The development of integrated petrochemical industry in the Arab region
Draft	Research and development trends in the petrochemical industry
	Current world situation in petrochemicals (1991)
ID/WG.522/4(SPEC.)	Report: Global Preparatory Meeting for the Regional Consultation on the Petrochemical Industry in the Arab Countries, Karachi, Pakistan, 10-13 December 1991
	Reference documents
PPD.156(SPEC.)	Project profile on a downstream petrochemical product for the Arab region: Cumene
PPD.157(SPEC.)	Project profile for the establishment of dioctyl phthalate (DOP) production plants in the Arab world
PPD.158(SPEC.)	Project profile for the establishment of polyamide production plants in the Arab world

PPD.159(SPEC.)	Project profile on a downstream petrochemical product in the Arab region: Maleic anhydride
PPD.160(SPEC.)	Project profile for the establishment of polyol production plants in the Arab world
Draft	Directory on technological capabilities in developing countries related to the petrochemical industry (1991)

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